

REMARKS

At the time the present Office Action issued, claims 1 to 8 were pending.

Consideration of reference under AU on Form PTO-1449

Examiner has lined through the Search Reports cited under item AU as not considered due to apparent mismatch of dates.

It is respectfully submitted that the dates indicated on the Form PTO-1449 correspond with the mailing date of the search reports. Based on the correct identification by the Examiner of the International application numbers to which the Search Reports pertain, the following table shows the International application numbers, the date of completion of the corresponding search report and the date of mailing of the search reports.

International Application No	Date search completed	Date search report mailed
PCT/EP03/07787	14/10/2003	20/10/2003
PCT/EP03/07790	08/10/2003	31/10/2003
PCT/EP03/08060	16/10/2003	22/10/2003

Examiner's consideration is respectfully requested.

Amendments

Claim 1 has been amended by addition of "in a circumferential direction" as disclosed bridging lines 13 and 14 of page 28 in the originally filed specification. Although not called for in the Office Action, the claim has been re-arranged to create an antecedent basis for "tubular ends". The term "such that oxides are removed from the forge welded tubular ends and the amount of oxide inclusions and irregularities between the forge welded tubular ends is limited" has been moved to a new dependent claim 9. Basis is found in the fact that the original specification in various locations (e.g. page 2 lines 28-30; page 4 lines 28-30; page 26 lines 30-32) mentions flushing the reducing flush gas around the tubular ends without further reference to removing oxide inclusions and irregularities.

The phrase "in an expanded or unexpanded configuration" has been deleted from claim 4 and recited in newly added dependent claims 10 and 11.

New claim 12 is added to recite subject matter disclosed on page 3 of the original specification, lines 19-20.

New claims 13 and 14 have been added reciting subject matter disclosed on page 6 lines 27 to 32 in conjunction with Figures 17 and 18.

A typing mistake has been corrected in Claim 6, and correspondingly on page 4 of the specification.

It is respectfully submitted that the amendments do not constitute addition of subject matter.

Claim rejections under 35 USC § 103

Paragraph 3: Claims 1, 2, 4, and 6

In Numbered paragraph 3 of the present Office Action, claims 1, 2, 4, and 6 have been rejected under 35 USC § 103(a) as being unpatentable over Moe (US Pat. 4,736,084) taken with Liady (US Pat. 1,260,690).

The rejection states that Figure 1 and the discussion at columns 2-3 of the patent to Moe discloses a method of joining tubulars wherein a reducing gas is flushed around the heated tubular ends and the ends of the tubulars are forged welded. It is then acknowledged that the claims differ from Moe in calling for tubular ends with a non-planar shape, and more specifically with a sinusoidal or teethed shapes. The Office Action then alleges that this differences does not patentably distinguish over the prior art. It is stated that at the time the Applicant's invention was made, it would have been obvious to have provided the tubulars in Moe with the end shapes claimed, the motivation being the teachings of Liady that such are advantageous for welding tubulars (see Figures 1-4 in Liady).

Attorney for Applicant respectfully traverses the rejections.

When reading the art, without taking benefit of hindsight having knowledge of the applicant's disclosure, there is no suggestion or motivation in the cited references to modify the teaching of Moe or to combine the teachings.

Moe relates to a new methodology of welding whereby the elements that are to be joined are heated by high-frequency resistance heating. The presence of a narrow gap between the elements to be joined is essential in Moe, as that is said to cause the current to follow the material close to the gap surface thereby establishing a narrow heating zone in the vicinity of the gap surfaces. Consequently, it is important that the gap surfaces are positioned close to each other, but without being in physical contact with each other. (Moe, Col. 2 lines 33-36). Moe requires the full gap surfaces to be heated, which is established by the specific conductive properties associated with the gap. Only after the

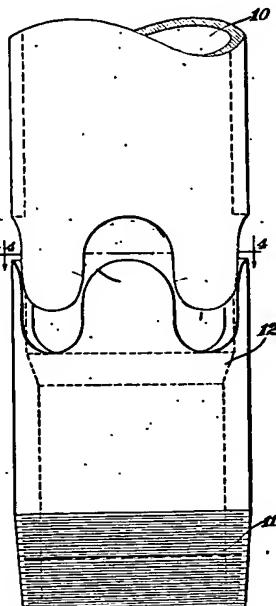
full gap surface is heated, the elements are brought into contact with each other to establish the full weld at once.

In addition, Moe discloses that a variation in the gap width leads to differences in current distribution which affects the uniformity of heating across the gap surfaces (Col. 3 lines 65 to 68). Moe employs shaped gap surfaces, especially of solid parts such as rods or bolts, such that the gap surfaces diverge somewhat from each other in an inwardly radial direction. This is taught to mitigate the current's preference to flow in a straight line across the gap surfaces between the contacts such as to increase the uniformity of heating (Col. 3 lines 44-53).

Liady discloses pipes provided with scallops, preferably formed with circular gullets and circular teeth of substantially the same arc described by the same radius to form a reverse curve which continues around the entire end of the pipes. The teeth of two pipe ends are permitted to interlock (Page 1 lines 42-54). Liady further teaches (Page 1 lines 83-86) that after being interlocked the pipes are welded by means of any suitable welding process, such as oxy-acetylene process and the like.

Thus, Liady cannot be applied to Moe since Moe requires a gap whereas Liady requires interlocking – thus closing the gap – before welding. Or stated differently, Moe does not provide a “suitable welding process” for application of Liady.

Moreover, Liady is not compatible with Moe's want for uniformity of heating either. When the tubulars of Moe would be provided with the end shapes of Liady, such as has been suggested by the Examiner, it would result in strong variation of gap width as can readily be seen in the following image which is based on Liady's Figures 1 and 2:



Based on Moe's teaching, Liady would lead to non-uniform heating due to the current not following the surface gap at the extremities of the circular gullets. Moe teaches employing an inwardly radially directed divergence of the gap width – not a circumferential one as in Liady – to mitigate other causes of non-uniformity. Liady introduces non-uniformity and thus goes against Moe's teaching. So even if the person of ordinary skill in the art would disregard Liady's teaching of interlocking prior to welding, he would be deterred from combining Liady's teaching with Moe's.

In conclusion, the person of ordinary skill in the art would not find motivation in the art to combine Moe with Liady because the potential benefit of such combination is offset and outweighed by fundamental incompatibilities.

Thus, the Examiner has not established a *prima facie* case of obviousness, for lack of motivation to combine the cited references and/or failure to set forth how the cited combination would disclose or teach every claimed element. For these reasons, reconsideration, and ultimately withdrawal, of the rejections is respectfully requested.

In addition to the above, for completeness sake, it is respectfully submitted that the Office Action does not point out where or how the cited combination of references (if it would have been made notwithstanding the lack of motivation) discloses or teaches:

- a casing-while-drilling string which carries a drill bit and remains in the borehole after completion of the drilling process (relevant in view of present claim 4);
- a series of electrodes pressed against the tubular ends adjacent to the tips of the teeth and/or sinusoidal end faces (relevant in view of claim 6).

Paragraph 4: Claim 3

In Numbered paragraph 4 of the Office Action, claim 3 has been rejected under 35 USC § 103(a) as being unpatentable over Moe (US Pat. 4,736,084) taken with Liady (US Pat. 1,260,690) as applied to claims 1, 2, 4, and 6, and further in view of Moyer (US 2,719,207) and Rothschild (US 2,497,631).

Attorney for Applicant respectfully traverses the rejection.

It has been shown that no *prima facie* case of obviousness has been established by applying Moe and Liady, for lack of motivation to combine these references.

Moyer and Rothschild do not remedy this lack of motivation. Hence, no *prima facie* case of obviousness has been established against claim 3 either, for at least the same reasons as given above.

Rothschild relates to arc welding where an arc (11) is maintained between an electrode (6) and the work piece (10). This technique requires physical contact of the

pieces to be welded, which goes against Moe. Moreover, this technique is inherently non-uniform as the work piece is exclusively heated in the arc.

Moyer discloses an apparatus and method for producing a non-oxidizing atmosphere for flash welding. A current flows across the gap between the work pieces to heat the ends of the work pieces. A fairly uniform gap is thus required, in order to ensure uniform heating across the end surfaces of the work pieces. At most, Moyer is thus cumulative to Moe and likewise not compatible with Liady.

Because no *prima facie* case has been established, reconsideration, and ultimately withdrawal of the rejection is respectfully requested.

Paragraph 5: Claim 5

Numbered paragraph 5 of the Office Action rejects claim 5 as being unpatentable over Moe (US Pat. 4,736,084) taken with Liady (US Pat. 1,260,690) as applied to claims 1, 2, 4, and 6, and further in view of Moe (US Pat. 5,721,413).

Attorney for Applicant respectfully traverses the rejection.

It has been shown that no *prima facie* case of obviousness has been established by applying Moe '084 and Liady, for lack of motivation to combine these references.

Moe '413 does not remedy this lack of motivation. Hence, no *prima facie* case of obviousness has been established against claim 5, either, for at least the same reasons as given above.

Paragraph 6: Claims 7 and 8

In Numbered paragraph 6, claims 7 and 8 have been rejected as being unpatentable over Moe (US Pat. 4,736,084) taken with Liady (US Pat. 1,260,690) as applied to claims 1, 2, 4, and 6, and further in view of Hitz (US 2,998,646).

Attorney for Applicant respectfully traverses the rejection.

It has been shown that no *prima facie* case of obviousness has been established by applying Moe and Liady, for lack of motivation to combine these references.

Hitz does not remedy this lack of motivation. In fact, Hitz teaches away from Moe, because in Col. 2, lines 4-10, drawbacks of resistance welding or flash welding are discussed and include a non-uniform metallurgical condition. This brings about Hitz's requirement of reasonably uniform heating over a large area of the tubular, not just the butt surfaces, which teaches against Moe who desires a concentrated heating zone on the gap surfaces only to enhance the speed.

It is also not possible to apply Hitz on interlocking pipe ends of Liady, for Hitz requires a beveled pipe end inserted inside another pipe end in order to bring the weld

joint area under extreme high pressure by expanding the beveled pipe against the other pipe.

In addition, the Office Action does not set forth how and where the combination of references discloses or teaches:

- joining the pipe ends downhole (in fact, the equipment of Hitz including the external ring seems much too large for down-hole application)(relevant in view of claim 7 as well as 8);
- a forge welding device, inserted inside the tubulars, which flushes a reducing flushing gas (relevant in view of claim 8).

Hence, no *prima facie* case of obviousness has been established against claims 7 or 8, either, for at least the same reasons as given above regarding claim 1 and for the additional reasons set forth here. These rejections should therefore be withdrawn upon reconsideration, which is herewith requested.

Concluding remarks

Attorney has addressed each and every ground for rejection raised by the Examiner in the Office Action. Reconsideration is respectfully requested.

It is respectfully remarked that Numbered paragraph 7 of the Office Action states prior art made of record but not relied upon. Applicant will not comment on this reference before they are actually applied to one or more of the claims.

Attorney respectfully submits that the specification, drawings, and claims – original, new and amended – are now in a state ready for allowance.

Should the Examiner be of a different opinion, it is respectfully requested to issue a second non-final Office Action, which more clearly than is presently the case explains the pertinence of each reference to each rejected claim, as required under 37 CFR 1.104(c)(2), last sentence.

In the event the Examiner has any questions or issues regarding the present application, the Examiner is invited to call the undersigned prior to the issuance of any written action.

Respectfully submitted,
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